



Association Among Television and Computer/Video Game Use, Victimization, and Suicide Risk Among U.S. High School Students

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Abstract

With the increasing popularity of mobile Internet devices, the exposure of adolescents to media has significantly increased. There is limited information about associations between the types and frequency of media use and experiences of violence victimization and suicide risk. The current study sought to examine the association of bullying and teen dating violence (TDV) victimization, suicide risk with different types of media use (i.e., television and computer/video game use), and number of total media use hours per school day. Data from the nationally representative 2015 Youth Risk Behavior Survey ($n = 15,624$) were used to examine the association between media use and violence victimization and suicide risk. Logistic regression models generated prevalence ratios adjusted for demographic characteristics and substance use behaviors to identify significant associations between media use and victimization and suicide risk, stratified by gender. Media use was associated with TDV victimization for male students only, while media use was related to experiences of bullying and suicide risk for both male and

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female students. In addition, limited (2 or fewer hours) and excessive (5 or more hours) media use emerged as significant correlates of suicide risk and bullying victimization, with limited media use associated with decreased risk and excessive media use with increased risk. Comprehensive, cross-cutting efforts to prevent different forms of victimization should take into account media use and its potential association with adolescent victimization and suicide risk. The current study results suggest limiting adolescent media use, as part of comprehensive prevention programming, might relate to reductions in risk for victimization and suicide.

Keywords

media and violence, dating violence, domestic violence, bullying

Mobile and online media have become ubiquitous in the lives of adolescents, due to the increased availability of computers, smartphones, and tablets. In 2015, 73% of United States youth aged 13 to 17 years had or had access to a smartphone; 58% owned or had access to a tablet; and 87% owned or had access to a desktop/laptop computer (Lenhart, 2015; Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013). On average, youth spend nearly 9 hr a day using media, outside of school or homework (Rideout, 2015). Recognizing the potential benefits and risks of media use, the American Academy of Pediatrics (AAP; 2016) recommends that parents of school-aged youth develop a media plan to limit children's time using media and the types of media they use as well as ensure media use does not replace essential health behaviors (e.g., sleep, physical activity). The landscape of media use has evolved as computers and Internet access have become increasingly mobile, particularly given the availability of smartphones and tablets, allowing adolescents to consume media more than ever. While our understanding of media's impact on adolescent development is burgeoning, it is not well known how increased consumption has affected their interpersonal lives.

Research has demonstrated benefits to adolescent media use, such as exposure to new ideas and access to social support networks, which may be particularly important for those who feel socially isolated, such as gay, lesbian, bisexual, transgender, and questioning youth and other potentially vulnerable populations (Reid Chassiakos et al., 2016). Furthermore, social media provides an opportunity for adolescents to connect and communicate with friends, and to learn and practice self-presentation and self-disclosure (Valkenburg & Peter, 2011). Given that the Internet provides some anonymity, shy or anxious teens can practice social skills in an environment which may be less threatening than face-to-face interactions (Dana & Paul, 2014).

In addition, online forums provide opportunities for social connections among adolescents with similar experiences. The Internet can also offer refuge for youth who are struggling, such as those who are depressed or dealing with the aftermath of trauma. For adolescents experiencing suicidal ideation, the Internet contains various suicide prevention resources and can raise awareness about prevention programs, crisis hotlines, and other support resources (Luxton, June, & Fairall, 2012).

Despite these benefits, media use also carries some risk. There is a plethora of information available on the Internet supporting suicide and studies have shown that obtaining pro-suicide information, including detailed descriptions of suicide methods, is alarmingly easy (Luxton et al., 2012). In addition, research has linked media use with depression, a known risk factor for suicide (Hawton, Casañas I Comabella, Haw, & Saunders, 2013; Shaffer et al., 1996). For example, longitudinal research has demonstrated a positive association between adolescents' television (TV) watching and their likelihood of developing depression later in life (Bickham, Hswen, & Rich, 2015; Primack, Swanier, Georgiopoulos, Land, & Fine, 2009). Recent research has linked greater social media use to increased depression and anxiety, and lower self-esteem among adolescents (Woods & Scott, 2016). Indeed, social media use exposes adolescents to opportunities for cyberbullying (i.e., threats, harassment, or embarrassment via technology), which has been more strongly linked to suicide ideation than traditional, in-person bullying (Luxton et al., 2012; van Geel, Vedder, & Taniol, 2014).

Frequent media use has also been associated with various health risk behaviors, including early onset of alcohol use and involvement in physical fights (Denniston, Swahn, Hertz, & Romero, 2011). Among pre-adolescent girls, increased media use—as measured by the Centers for Disease Control and Prevention's (CDC) Youth Risk Behavior Survey (YRBS)—has been associated with low self-esteem and low commitment to physical activity (Racine, DeBate, Gabriel, & High, 2011). Among a sample of undergraduate male students, higher TV consumption was associated with rigid beliefs about masculinity and the male gender role, which in turn was related to risky behaviors, including sexual risk-taking and substance use (Giaccardi, Ward, Seabrook, Manago, & Lippman, 2017).

The content of media to which adolescents are exposed is concerning given representations of men as violent and women as sexual are increasing in the media (Bleakley, Jamieson, & Romer, 2012). A growing body of research links exposure to violent or antisocial media to aggression, including in-person bullying and cyberbullying (Bushman & Huesmann, 2006; den Hamer & Konijn, 2015), and exposure to sexual media to risky sexual behaviors (Brown & Strasburger, 2007; Strasburger, 2009a, 2009b; Strasburger &

Hogan, 2013), including earlier onset of sexual initiation (Collins et al., 2004). In a longitudinal survey of youth and caregivers, exposure to sexual media content was linked to higher odds of sexual violence victimization (Ybarra, Strasburger, & Mitchell, 2014), while exposure to violent sexually explicit content significantly increased odds of perpetrating sexually aggressive behavior (i.e., in-person and technological sexual harassment; Ybarra, Mitchell, Hamburger, Diener-West, & Leaf, 2011).

Gender differences have emerged in the medium through which adolescents are exposed to sexual media content, as female adolescents were more likely to be exposed to such content in music, movies, and TV, while male adolescents were more likely to be exposed to sexual media content on the Internet and in computer, video, and Internet games (Ybarra et al., 2014). Not surprisingly, there are significant gender differences in girls' and boys' use of different types of media and online behaviors. While teenage boys are more likely to have access to a gaming console and play video games online or with a mobile phone, girls are more likely than boys to use visual social media platforms for sharing, such as Instagram and Snapchat (Lenhart, 2015). Still, most adolescents, regardless of sex, report that Facebook is the site they visit most frequently. Racial differences in media use also exist. For example, Black adolescents watch more TV and are less likely to own a computer than non-Black adolescents (Ellithorpe & Bleakley, 2016; Perrin, 2017). In addition, Black and Hispanic youth report less access to desktop computers than their White counterparts, though Black teens have greater access to smartphones and are more likely to play video games than both White and Hispanic teens (Lenhart, 2015).

Hypotheses

Relatively little is known about the potential relationship between different types of media use (i.e., TV, computer/video games) and different forms of interpersonal violence (e.g., bullying, teen dating violence [TDV]) and suicide risk, and how those relationships may vary by gender. The current study uses the 2015 national YRBS to examine associations between TV and computer/video game use and experiences of bullying victimization, TDV victimization, and measures of suicide risk. Given the link between media use, health risk behaviors, and violence victimization and perpetration, we hypothesized that media use—as measured by TV and computer/video game use in the current study—would be significantly associated with both forms of victimization and suicide risk. Furthermore, because of the increased opportunity afforded by computer use to access social media, we also

hypothesized that higher usage of computer/video games would be most strongly associated with electronic forms of victimization (i.e., electronic bullying).

Method

Data Source and Study Population

The YRBS is a nationally representative, cross-sectional, school-based survey administered on a biennial cycle by the CDC since 1991. For the 2015 YRBS cycle, the sampling frame consisted of all regular private and public schools with students in Grades 9 to 12 in the 50 states and the District of Columbia (Kann et al., 2016). Student participation in the YRBS is entirely voluntary and anonymous, and conducted in accordance with local requirements for parental permission. During a regular class period, students recorded their responses to a 99-item self-administered questionnaire. YRBS questions have generally shown good test–retest reliability (Brener et al., 2002; Brener et al., 2013). To account for school and student nonresponse, as well as the oversampling of Black and Hispanic students, the YRBS data are weighted. The school and student response rates for the 2015 national YRBS were 69% and 86%, respectively. The overall response rate, a product of school and student response rates, was 60% (Kann et al., 2016). The overall sample size was 15,624 (7,749 male and 7,757 female students; 118 students were missing data for gender). Missing data were not imputed. Additional details of YRBS sampling strategies have been reported elsewhere (Brener et al., 2002; Kann et al., 2016). The national YRBS has been approved by the Institutional Review Board of the CDC.

Measures

Bullying victimization. Students were presented with the following stem prior to responding to questions about bullying:

The next two questions ask about bullying. Bullying is when one or more students tease, threaten, spread rumors about, hit, shove, or hurt another student over and over again. It is not bullying when two students of about the same strength or power argue or fight or tease each other in a friendly way.

Bullying victimization was assessed with the following questions: “During the past 12 months, have you ever been bullied on school property?” and “During the past 12 months, have you ever been electronically bullied?”

Response options were yes/no for both bullying questions. “Yes” responses to both bullying items were combined to create an additional aggregate bullying variable.

Dating violence. The 2015 YRBS includes two forms of dating violence victimization: physical (“During the past 12 months, how many times did someone you were dating or going out with physically hurt you on purpose? Count such things as being hit, slammed into something, or injured with an object or weapon”) and sexual dating violence (“During the past 12 months, how many times did someone you were dating or going out with force you to do sexual things that you did not want to do? Count such things as kissing, touching, or being physically forced to have sexual intercourse”). Response options included “I did not date or go out with anyone during the past 12 months”; “0 times”; “1 time”; “2 or 3 times”; “4 or 5 times”; or “6 or more times.” These two questions generated a four-level variable: no TDV victimization, physical TDV victimization only, sexual TDV victimization only, and both physical and sexual TDV victimization. Only those who had dated during the past 12 months and had complete data for gender and both dating violence variables were included in analyses for TDV ($n = 10,093$).

Suicide risk. Three measures of suicide risk from the YRBS were included: (a) seriously considered suicide (“During the past 12 months, did you ever seriously consider attempting suicide?”), (b) made a plan to attempt suicide (“During the past 12 months, did you make a plan about how you would attempt suicide?”), and (c) attempted suicide (“During the past 12 months, how many times did you actually attempt suicide?”). Participants responded to the first two questions with yes/no and the last question “0 times,” “1 time,” “2 or 3 times,” “4 or 5 times,” or “6 or more times.” Responses >1 time constituted attempted suicide. A general suicide risk variable was also created, in which a “yes” response to any suicide question constituted any suicide risk during the past 12 months.

Media use. The length and type of media use was assessed in the 2015 YRBS by two questions: “On an average school day, how many hours do you watch TV?” and “On an average school day, how many hours do you play video or computer games or use a computer for something that is not school work?” Response options ranged from *not at all*, to *5 or more hours a day*, in 1-hr increments. A continuous calculated variable, total screen time, was created by combining responses to both questions—resulting in a range of 0 hr/average school day to 10 hr/average school day (with the maximum value for each form of media use truncated at 5 hr).

Statistical Analysis

Descriptive statistics of demographic and main independent variables were assessed by gender and compared using the chi-square test. Differences in the prevalence of watching TV >3 hr/average school day, computer/video game use >3 hr/average school day, and >3 hr/average school day each of watching TV *and* using computer/video games by demographic characteristics among male and female students were assessed by chi-square tests.

The relationship between forms of violence victimization or suicide risk and frequent use of forms of media was assessed by using gender-stratified logistic regression analysis, which generated adjusted prevalence ratios (aPR). Based on prior literature (Reid Chassiakos et al., 2016), models were stratified to observe potential gender-dependent associations between media use and different forms of victimization, possibly due to the content to which male and female adolescents are exposed while using media. Models focused on the association between bullying victimization and media use were adjusted for demographic variables such as race/ethnicity, grade, sexual identity, and substance use—current alcohol use (past 30 days) and current marijuana use (past 30 days). Models focused on the association between TDV victimization or suicide risk and frequent use of media were not only adjusted for demographic characteristics and substance use behaviors but also included the following covariates: bullied electronically and bullied on school property. Substance use behaviors were included given research linking substance use to various forms of victimization, including bullying (Hertz, Everett Jones, Barrios, David-Ferdon, & Holt, 2015) and TDV (Parker & Bradshaw, 2015), and suicide ideation (Swahn et al., 2012). Furthermore, bullying was adjusted in models for TDV victimization and suicide risk, as research has shown overlap with experiences of bullying victimization (Debnam, Waasdorp, & Bradshaw, 2016; Holt et al., 2015; Vivolo-Kantor, Olsen, & Bacon, 2016). The relationship between forms of violence victimization or suicide risk and measures of total screen time were also assessed using gender-stratified logistic regression analysis, which generated adjusted prevalence ratios. Given AAP's recommendation that adolescents limit their time using media (AAP, 2016) and the upper bound of response options for media use, students using media 2 hr or less/average school day were compared with those using media 5 hr or more/average school day to examine the respective impact of limited and frequent media use on victimization and suicide risk. Model covariates for each measure of violence victimization and suicide risk mirrored those for the aforementioned models. All analyses were performed in SAS version 9.4 (SAS Institute Inc, 2013), using SUDAAN (Witt, 2008) to account for YRBS's complex survey design.

Results

The only significant difference in demographics between male and female students was for sexual identity, with more female than male students identifying as gay/lesbian or bisexual (11.8% vs. 4.3%; see Table 1 for demographics). Media use did not vary significantly by gender. All violence victimization (bullying, TDV) and measures of suicide risk were more common among female students ($p < .0001$ for all variables).

Table 2 presents the gender-stratified demographic composition of participants who used different forms of media (TV, computer/video games, or both) for 3 or more hours/average school day (not for school work). Among male students who watched TV for 3 or more hours, the highest prevalence was observed among Black students (37.0%), and among male students who used computers/video games 3 or more hours, significant variation by grade (most prevalent: 10th-grade students, 43.4%) and sexual identity (most prevalent: not sure students, 59.1%) was observed. Black (17.8%) and Hispanic (16.8%) male students were significantly more likely than White students (11.3%) to use both types of media for 3 or more hours. Among female students who watched TV for 3 or more hours, the highest prevalence was observed among Black students (41.5%), and among female students who used computers/video games 3 or more hours, significant variation by grade (most prevalent: ninth-grade students, 48.7%) and sexual identity (most prevalent: lesbian or bisexual students, 53.5%) was observed. Among female students who reported 3 or more hours of use of both forms of media, the highest prevalence was observed among Black female students (23.9%).

Different patterns in the association between hours of media use per average school day and violence were observed for male and female students (see Table 3). Male students who experienced both physical and sexual TDV ($aPR = 1.48$, 95% confidence interval $[CI] = [1.02, 2.14]$) were significantly more likely to have watched TV 3 or more hours compared with male students who did not experience both forms of victimization; however, male students who had a history of attempted suicide were significantly less likely to have watched TV 3 or more hours compared with their male counterparts who did not have a history ($aPR = 0.71$ $[0.52, 0.97]$). Among female students, being bullied on school property was associated with watching 3 or more hours of TV compared with female students who were not bullied on school property ($aPR = 1.17$ $[1.03, 1.33]$). Male and female students who had seriously considered suicide, made a plan to attempt suicide, and reported any suicide risk were also significantly more likely to engage in frequent computer/video game use compared with students who did not have these forms of suicide

Table 1. Demographic Characteristics, Media Use, and Victimization and Suicide Risk Among U.S. High School Students.

Characteristics ^a	Males (<i>n</i> = 7,749)		Females (<i>n</i> = 7,757)		<i>p</i> Value ^b
	<i>n</i>	%	<i>n</i>	%	
Race/ethnicity ^c					
White ^d	3,370	53.6	3,460	55.5	.4951
Black ^e	837	14.1	821	13.1	
Hispanic	2,541	22.2	2,559	22.4	
Grade					
9th	1,963	28.1	2,025	26.4	.4405
10th	1,964	25.0	1,956	26.5	
11th	1,979	24.1	1,938	23.7	
12th	1,788	22.8	1,802	23.5	
Sexual identity					
Heterosexual	6,779	93.1	6,105	84.5	<.0001
Gay, lesbian, or bisexual	332	4.3	901	11.8	
Not sure	199	2.6	296	3.7	
Current alcohol use (past 30 days)	2,216	32.2	2,414	33.5	.3958
Current marijuana use (past 30 days)	1,778	23.2	1,553	20.1	.0312
Media use/average school day					
≥3 hr watching TV	2,004	25.0	1,988	24.4	.6085
≥3 hr playing video games, computer games, or using a computer (not for school work)	3,164	40.6	3,319	42.8	.2018
Watched TV ≥3 hr a day and spent ≥3 hr playing video games, computer games, or using a computer (not for school work)	1,120	13.3	1,056	12.8	.5263
Experienced bullying					
Electronically bullied	717	9.7	1,531	21.7	<.0001
Bullied on school property	1,202	15.8	1,733	24.8	<.0001
Both bullied electronically and on school property	441	5.8	989	14.3	<.0001
Experienced dating violence ^c					
None	4,485	90.4	3,993	78.6	<.0001
Physical dating violence only	228	4.2	328	5.8	
Sexual dating violence only	130	2.3	477	9.7	
Both physical and sexual dating violence	143	3.1	309	5.9	
Suicide risk					
Seriously considered suicide	936	12.2	1,852	23.4	<.0001
Made a plan to attempt suicide	774	9.8	1,535	19.4	<.0001
Attempted suicide	360	5.5	831	11.6	<.0001
Any suicide risk (yes to at least one of the three suicide variables)	1,221	16.1	2,170	27.3	<.0001

^aSample size for each variable may not sum to total sample size given variation in missing data.^bChi-square.^cRace/ethnicity "other" is not reported due to limited interpretability.^dNon-Hispanic.^eAmong the 4,986 male and 5,107 female students who reported dating during the past 12 months, and who had complete data for each of the dating violence variables.

Table 2. Prevalence of Media Use in Hours/Average School Day by Demographics and Gender Among U.S. High School Students.

	Males				Females			
	≥3 Hr Watching TV		≥3 Hr Playing Video Games, Computer Games, or Using a Computer (Not for School Work)		≥3 Hr Watching TV		≥3 Hr Playing Video Games, Computer Games, or Using a Computer (Not for School Work)	
	%	p Value ^a	%	p Value	%	p Value	%	p Value
Race/ethnicity								
White	21.4	.0018	38.9	.0730	11.3	.0038	18.8	<.0001
Black	37.0		41.2		17.8		41.5	
Hispanic	27.4		45.1		16.8		29.2	
Grade								
9	26.3	.6777	42.5	.0043	15.7	.0608	25.3	.2250
10	24.6		43.4		13.7		24.1	
11	24.6		36.1		12.3		22.4	
12	24.4		40.8		11.2		25.9	
Sexual identity								
Heterosexual	25.1	.3017	39.6	.0005	13.2	.0724	23.6	.2569
Gay, lesbian, or bisexual	22.6		48.8		13.4		25.7	
Not sure	30.8		59.1		22.5		29.9	
							40.9	.0006
							53.5	
							49.3	

^aChi-square.

.33374

Table 3. Types of Media Use and Victimization and Suicide Risk Among U.S. High School Students.

	>3 Hr Watching TV		>3 Hr Playing Video Games, Computer Games, or Using the Computer (Not for School Work)		Watched TV >3 Hr and Spent >3 Hr Playing Video Games, Computer Games, or Using the Computer (Not for School Work)	
	aPR ^{a,b}	95% CI	aPR ^{a,b}	95% CI	aPR ^{a,b}	95% CI
Males						
Experienced bullying						
Electronically bullied	1.13	[0.86, 1.49]	1.32**	[1.12, 1.55]	1.60**	[1.15, 2.22]
Bullied on school property	1.17	[0.96, 1.42]	1.25**	[1.07, 1.46]	1.55**	[1.20, 2.01]
Both bullied electronically and on school property	1.26	[0.97, 1.62]	1.44*	[1.12, 1.85]	1.96**	[1.36, 2.82]
Experienced dating violence ^{c,d}						
None	Ref		Ref		Ref	
Physical dating violence only	0.97	[0.75, 1.26]	1.05	[0.83, 1.33]	1.16	[0.70, 1.92]
Sexual dating violence only	1.13	[0.75, 1.70]	1.17	[0.86, 1.59]	1.39	[0.78, 2.46]
Both physical and sexual dating violence	1.48†	[1.02, 2.14]	1.20	[0.89, 1.61]	2.06*	[1.17, 3.65]
Suicide risk						
Seriously considered suicide ^c	0.87	[0.71, 1.07]	1.21**	[1.06, 1.37]	0.90	[0.70, 1.18]
Made a plan to attempt suicide ^c	0.96	[0.78, 1.18]	1.34***	[1.16, 1.54]	1.19	[0.95, 1.48]

(continued)

Table 3. (continued)

	>3 Hr Watching TV		>3 Hr Playing Video Games, Computer Games, or Using the Computer (Not for School Work)		Watched TV >3 Hr and Spent >3 Hr Playing Video Games, Computer Games, or Using the Computer (Not for School Work)	
	aPR ^{a,b}	95% CI	aPR ^{a,b}	95% CI	aPR ^{a,b}	95% CI
Attempted suicide ^c	0.71*	[0.52, 0.97]	1.11	[0.96, 1.29]	0.76	[0.56, 1.16]
Any suicide risk ^c	0.89	[0.75, 1.06]	1.20**	[1.09, 1.33]	0.97	[0.77, 1.22]
Females						
Experienced bullying	0.97	[0.85, 1.12]	1.20**	[1.08, 1.34]	1.29*	[1.05, 1.58]
Electronically bullied			1.03	[0.95, 1.13]	1.16	[0.96, 1.40]
Bullied on school property	1.17*	[1.03, 1.33]	1.13	[0.97, 1.31]	1.29*	[1.06, 1.57]
Both bullied electronically and on school property	1.04	[0.90, 1.20]				
Experienced dating violence ^{c,d}						
None	Ref		Ref		Ref	
Physical dating violence only	0.91	[0.67, 1.21]	1.05	[0.87, 1.27]	0.80	[0.53, 1.22]
Sexual dating violence only	1.05	[0.80, 1.39]	1.08	[0.89, 1.33]	1.14	[0.82, 1.57]
Both physical and sexual dating violence	0.96	[0.71, 1.28]	1.11	[0.94, 1.31]	0.92	[0.61, 1.39]

(continued)

Table 3. (continued)

	>3 Hr Watching TV		>3 Hr Playing Video Games, Computer Games, or Using the Computer (Not for School Work)		Watched TV >3 Hr and Spent >3 Hr Playing Video Games, Computer Games, or Using the Computer (Not for School Work)	
	aPR ^{a,b}	95% CI	aPR ^{a,b}	95% CI	aPR ^{a,b}	95% CI
Suicide risk						
Seriously considered suicide ^c	1.13	[0.98, 1.30]	1.14***	[1.06, 1.22]	1.35***	[1.11, 1.66]
Made a plan to attempt suicide ^c	1.06	[0.91, 1.23]	1.13**	[1.04, 1.23]	1.18	[0.95, 1.46]
Attempted suicide ^c	1.22	[0.96, 1.56]	0.99	[0.88, 1.12]	1.24	[0.92, 1.67]
Any suicide risk ^c	1.15	[1.00, 1.32]	1.17***	[1.09, 1.26]	1.33***	[1.08, 1.64]

Note. CI = confidence interval.

^aAdjusted prevalence ratio.

^bModels adjusted for race/ethnicity, grade, and sexual identity; current alcohol use; and current marijuana use.

^cModels adjusted for race/ethnicity, grade, sexual identity, current alcohol use, current marijuana use, bullied electronically, and bullied on school property.

^dAmong the 4,986 male and 5,107 female students who reported dating during the 12 months prior to the survey, and who had complete data for each of the dating violence variables.

[†]p<.10; *p<.05; **p<.01; ***p<.001; ****p<.0001

ideation. Male students who experienced all forms of bullying and female students who had been electronically bullied only were also significantly more likely to engage in frequent computer/video game use compared with their counterparts who did not experience those forms of bullying. Male students who experienced both forms of bullying and both physical and sexual TDV were significantly more likely to use both types of media 3 or more hours compared with male students who did not experience those forms of bullying or TDV. Female students who experienced electronic bullying and both types of bullying seriously considered suicide, and any suicide risk were significantly more likely to frequently use both types of media compared with female students without these risk exposures.

Limited cumulative media use was associated with less suicide risk, as male and female students who had seriously considered suicide or endorsed any suicide risk were significantly less likely to have adhered to limited screen time (2 hr or less per average school day) than students who did not have these forms of suicide ideation (Table 4). Male students who had made a plan to attempt suicide were also significantly less likely to limit their screen time than male students who had not made a plan. In contrast, frequent media use (5 or more hours/average school day) was significantly associated with increased victimization and suicide risk, though patterns differed for male and female students. Male students who experienced all forms of bullying and made a plan to attempt suicide and female students who experienced all forms of bullying and all measures of suicide risk were significantly more likely than their male and female counterparts to have used media for 5 or more hours/average school day.

Discussion

Media use has increased substantially among adolescents (AAP, 2016). While technological advances have increased the availability of information and presented new ways to connect and learn, increased use of media by youth may have some adverse consequences. Our hypothesis that frequently watching TV, frequently using computers/video games, or frequently using both forms of media would be significantly associated with experiences of bullying, TDV, and suicide risk was mostly supported, as media use was significantly associated with all three forms of victimization, though patterns differed for male and female students. Frequently watching TV was associated with physical and sexual TDV victimization for male students, but only being bullied on school property for female students. For both male and

Table 4. Total Screen Time/Average School Day and Victimization and Suicide Risk Among U.S. High School Students.

	<2 Hr of Screen Time		≥5 Hr of Screen Time	
	aPR ^{a,b}	95% CI	aPR ^{a,b}	95% CI
Males				
Experienced bullying				
Electronically bullied	0.75	[0.57, 1.00]	1.30**	[1.08, 1.56]
Bullied on school property	0.90	[0.76, 1.07]	1.23**	[1.08, 1.39]
Both bullied electronically and on school property	0.79	[0.57, 1.09]	1.43**	[1.15, 1.79]
Experienced dating violence ^{c,d}				
None	Ref		Ref	
Physical dating violence only	1.06	[0.83, 1.36]	1.17	[0.95, 1.43]
Sexual dating violence only	0.94	[0.61, 1.44]	1.29	[0.96, 1.74]
Both physical and sexual dating violence	1.03	[0.72, 1.50]	1.31	[0.96, 1.78]
Suicide risk				
Seriously considered suicide ^c	0.78**	[0.67, 0.91]	1.06	[0.90, 1.24]
Made a plan to attempt suicide ^c	0.76**	[0.63, 0.92]	1.24**	[1.06, 1.45]
Attempted suicide ^c	0.95	[0.73, 1.22]	1.01	[0.80, 1.28]
Any suicide risk (combined variable) ^c	0.80**	[0.68, 0.94]	1.11	[0.98, 1.25]
Females				
Experienced bullying				
Electronically bullied	0.88	[0.76, 1.01]	1.20**	[1.06, 1.35]
Bullied on school property	0.92	[0.83, 1.01]	1.14*	[1.01, 1.28]
Both bullied electronically and on school property	0.93	[0.79, 1.10]	1.20*	[1.05, 1.36]
Experienced dating violence ^{c,d}				
None	Ref		Ref	
Physical dating violence only	0.95	[0.79, 1.15]	1.24	[0.99, 1.55]
Sexual dating violence only	0.89	[0.71, 1.12]	1.02	[0.88, 1.19]
Both physical and sexual dating violence	0.87	[0.69, 1.09]	1.13	[0.91, 1.41]
Suicide risk				
Seriously considered suicide ^c	0.91*	[0.83, 0.99]	1.24****	[1.14, 1.35]
Made a plan to attempt suicide ^c	0.93	[0.83, 1.03]	1.23****	[1.15, 1.32]
Attempted suicide ^c	0.99	[0.86, 1.15]	1.20*	[1.03, 1.40]
Any suicide risk (combined variable) ^c	0.86***	[0.80, 0.93]	1.29****	[1.19, 1.39]

Note. CI = confidence interval.

^aAdjusted prevalence ratio.

^bModels adjusted for race/ethnicity, grade, and sexual identity; current alcohol use; and current marijuana use.

^cModels adjusted for race/ethnicity, grade, sexual identity, current alcohol use, current marijuana use, bullied electronically, and bullied on school property.

^dAmong the 4,986 male and 5,107 female students who reported dating in the 12 months prior to the survey, and who had complete data for each of the dating violence variables.

*p<.05; **p<.01; ***p<.001; ****p<.0001

female students, frequently using computers/video games was significantly associated with suicide risk and bullying; however, for female students, it was only related to electronic bullying, partially supporting our hypothesis that computer/video game use would be more strongly related to electronic forms of victimization.

Media use was associated with TDV for male students only, and it is not entirely clear why this is the case. Males who frequently watch TV may be exposed to more content that depicts violence in dating relationships, which translates to increased violence—victimization and perpetration—in their real-life relationships. Indeed, repeated exposure may normalize violence in dating relationships. Depictions of males as violent and females as sexual in the media have increased between 1950 and 2006 (Bleakley et al., 2012), lending some evidence to this hypothesis. Furthermore, research has demonstrated an association between watching TV and traditional attitudes about masculinity and gender among males (Giaccardi et al., 2017), which has also been linked to TDV (Reyes, Foshee, Niolon, Reidy, & Hall, 2016) and may help explain this finding. However, we would also expect that such media would be more strongly associated with TDV perpetration. Unfortunately, the YRBS does not inquire about TDV perpetration to address this possibility in the current study. On the contrary, because data are cross-sectional, we do not know if males who are at risk of TDV victimization may use more media to seek social support. Longitudinal research is needed to establish temporality and better understand this association for male students.

For all students, 5 or more daily hours of media use was associated with bullying and suicide risk, though it was more strongly associated with all measures of suicide risk for female students compared to male students. These findings could reflect different problems contributing to males' and females' frequent media use and suicide risk. For example, the association between frequent media use and suicide risk among female students may reflect behavioral manifestations of internal depressive symptoms (i.e., using media to cope). This is consistent with past research demonstrating greater internalizing symptoms (e.g., depression) among females (Hankin, 2009) and greater externalizing symptoms (e.g., antisocial behavior) among males (Bongers, Koot, van der Ende, & Verhulst, 2004) in adolescence. Alternatively, female adolescents who are at risk for suicide may use more media to find resources (e.g., crisis hotlines) and connect with similar peers. The content of media to which students are exposed may also contribute to differing experiences of bullying and suicide risk. However, for both genders, 2 hours or less per day of media use was not associated with suicide risk, suggesting that limiting media use in general may protect students against suicide risk and other victimization experiences.

There are a number of theoretical explanations for these findings as a whole to consider. Increased media use of any kind may diminish experiences of in-person interaction that help adolescents develop interpersonal relationship skills, such as prosocial behavior and conflict resolution. Limited interpersonal skills can then put adolescents at risk for multiple forms of victimization in relationships with dating partners, friends, and peers. The social isolation created by excessive media use might also limit opportunities for connectedness to family, peers, and others in the community, which is a protective factor for suicide risk (Stone et al., 2017). Furthermore, media exposure may create opportunities for victimization, especially electronic forms like electronic bullying. For example, both male and female adolescents could be exposed to electronic bullying through social media consumed during computer use. Alternatively, males may be more frequently playing video games than using social media, potentially compromising their development of interpersonal skills and making them vulnerable to all forms of bullying, but not suicide risk, as was the case with females. However, males may also play video games to cope with real-life problems. Future research is needed to disentangle the impact of computer use from that of playing video games.

Significant differences in TV watching and computer/video game use by race and sexual identity emerged, respectively. A greater proportion of Black males and females watched TV for 3 or more hours on an average school day than did their non-Black counterparts, consistent with past research demonstrating that Black adolescents watch more TV than non-Black adolescents (Ellithorpe & Bleakley, 2016). Black adolescents may watch more TV because they are less likely to own a computer than their White peers (Perrin, 2017). This may be due to the cost of computers, as Black households earn significantly less income on average than White ones (Pew Research Center, 2016). With regard to computer/video game use, significantly more male students who were not sure about their sexual identity and lesbian or bisexual female students used computer/video games for 3 or more hours on an average school day. These students could be using the computer to seek out information and connect with similar peers as part of their identity development. Indeed, research has demonstrated that gay, lesbian, and bisexual youth who use computers to access social network sites have a stronger commitment to their sexual identity (Bond & Figueroa-Caballero, 2016). In addition, males who are not sure about their sexual identity may be using computers to access web content relevant to identity exploration. They may also be using the computer instead of watching TV because there may be fewer depictions of sexual minority youth in TV shows and movies. Research with racial and sexual minority youth on their reasons for using different forms of media would help inform our understanding of these relationships.

Limitations

Because YRBS data are self-reported, it is not possible to determine the extent to which overreporting or underreporting occurred, though it should be noted that YRBS questions have generally been demonstrated to have good test–retest reliability (Brener et al., 2002; Brener et al., 2013). Media use measures do not specify content of media, and thus, it is only possible to discuss the association between media use in general and victimization and suicide risk. Similarly, our measure of media use does not ask about social media specifically, which likely comprises a significant amount of the content adolescents access when they use the computer and other media devices. Thus, it is not possible to explore how computer use to access social media may be related to victimization or suicide risk. Furthermore, teens likely access a considerable amount of media with smartphones and tablets; unfortunately, the 2015 YRBS does not inquire about these mediums, and so, the current study is also limited with regard to the relationship between media accessed with mobile devices and adolescent outcomes. The time frame for media use was also restricted to use on a typical school day, and thus, there may be an underestimation of media use as weekend use is likely higher than use on weekdays. Given the cross-sectional nature of YRBS data, the direction of association (i.e., temporality) between media use and victimization and suicide risk cannot be determined, and thus, readers should be cautioned against drawing conclusions about causation. Indeed, bi-directionality may exist in these associations, as media use may increase risk of victimization and suicide ideation, and experiences of victimization and suicide ideation may increase adolescents' use of different forms of media. Future research should use more time-sensitive measures of media use, and focus on clarifying temporality and identifying mechanisms for these associations. Finally, YRBS data only apply to youth who attend high school. According to a 2012 national study, approximately 3% of individuals aged 16 to 17 were not enrolled in a high school program (Stark & Noel, 2015).

Conclusion

These findings may be of interest to parents, educators, and health professionals as they identify risks for adolescent victimization and suicide risk. Because excessive media use appears to be associated with bullying, TDV, and suicide risk, youth may benefit from messaging that encourages avoidance of excessive screen time (AAP, 2016). Youth who use media excessively may have more exposure to media content that is violent in nature, which

might contribute to their experiences of real-life interpersonal violence and suicide risk. Research examining the specific content of media (e.g., violent or sexually explicit) is needed to further understand the mechanisms through which media use and victimization and suicide risk are associated, and to more directly inform primary violence prevention efforts. As the content to which adolescents are exposed is not likely to be modified, parents may diminish the impact of exposure to violent or risky media content by using media with their adolescent children and discussing how they feel about the violent or risky behaviors depicted (Collins et al., 2004). In addition, excessive screen time might indicate to parents that their child is having social, emotional, or other problems which could be leading to them withdrawing to TV or computer screens.

Health providers can consider these findings in the context of CDC technical packages, which discuss strategies to prevent different types of violence (Basile et al., 2016; David-Ferdon et al., 2016; Niolon et al., 2017; Stone et al., 2017), as media use may impact risk (e.g., substance use) and protective (e.g., connectedness) factors associated with multiple forms of violence. Comprehensive and cross-cutting efforts to prevent victimization and suicide risk should take into account the role that media use may play in increasing risks and vulnerability to victimization and suicide risk for adolescents. This study suggests that discouraging excessive screen time may be beneficial for reducing risk of victimization and suicide, in conjunction with other strategies to promote adolescent mental health.

Authors' Note

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Ethical Approval

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

Declaration of Conflicting Interests

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